(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 June 2001 (21.06.2001)

PCT

(10) International Publication Number
WO 01/45064 A1

(51) International Patent Classification[7]: G08C 17/02, H04Q 7/38

(21) International Application Number: PCT/IB00/01885

(22) International Filing Date:
12 December 2000 (12.12.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/466,141 17 December 1999 (17.12.1999) US

(71) Applicant: GATEWAY, INC. [US/US]; 610 Gateway Drive, North Sioux City, SD 57049 (US).

(72) Inventor: NELSON, Richard, F.; 384 Little Basin Creek, Butte, MT 59702 (US).

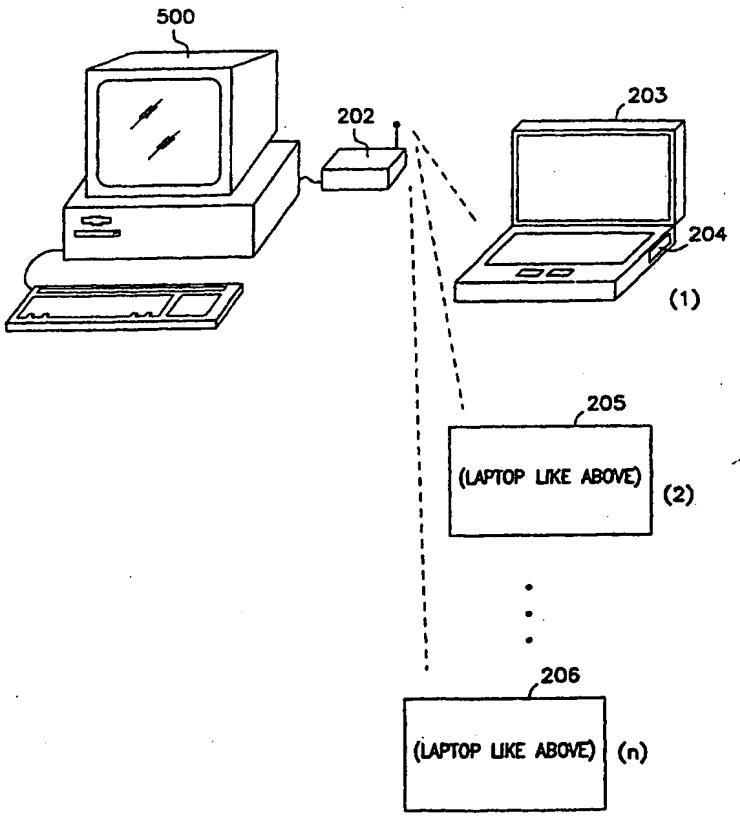
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*
— *Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.*

[Continued on next page]

(54) Title: METHOD AND DEVICE FOR CONTROLLING THE OPERATION OF ELECTRONIC DEVICES IN AN AIRCRAFT



(57) Abstract: The present invention provides a method and apparatus that enables control via a wireless data connection of portable electronic devices while the devices are in an airplane. The wireless data connection of some embodiments is operable to control the power state of the portable electronic device via the wireless data connection. The invention provides in further embodiments the ability to communicate other data such as flight data to the portable electronic devices via the wireless data connection. In some embodiments, the wireless data connection and portable electronic device comprise a Bluetooth wireless data connection operatively coupled to a portable computer.

WO 01/45064 A1

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

METHOD AND DEVICE FOR CONTROLLING THE OPERATION OF ELECTRONIC DEVICES IN AN AIRCRAFT

Field of the Invention

The invention relates generally to wireless communication of data in computers, and more specifically to use of wireless communication to communicate between laptop computers or other electronic devices and an airplane data system in an airplane.

Background

Concerns over electrical interference caused by electronic devices operated onboard aircraft has led to prohibition of use of most electronic devices during certain portions of a flight. It is widely believed that many microprocessor-driven devices may emit radio frequency noise that can interfere with an airplane's communication or flight control systems, and so pose a safety risk to the operation of the airplane. Also, devices such as cellular phones that are designed to emit radio signals at certain frequencies are similarly subject to restricted use rules, due to the same concerns over interference with electronic systems within the airplane.

Specific classes of electronic devices are typically subject to restrictions on use that vary with the perceived risk of interference and ease of deactivation. For example, watches, pacemakers and hearing aids may usually be used at any time, while use of devices such as radio transmitters, cellular telephones and remote-controlled toys is often banned altogether. But, a certain class of mid-risk devices often may be used during flights, but are prohibited from use during takeoff and landing. Such devices include handheld calculators or computer games, portable

BNSDOCID: <WO_____0145064A1_I_>

computer devices, portable compact disc and tape players, and electric shavers. While such devices may be used during the flight, the risk of interference is considered great enough that flight attendants enforce prohibition of their use during takeoff and landing by careful monitoring of passenger activity.

But, the few flight attendants on a typical flight may have a difficult time monitoring all passengers and ensuring compliance with the restriction, and even a single electronic device may emit enough radio frequency interference to interfere with the electronic systems on an aircraft. Even those passengers who desire to be in compliance with restrictions on use of electronic devices may not hear warnings, may turn electronic devices on too soon after takeoff, or may continue to operate devices into the landing portion of the flight. There is a need for a method or a device that serves to restrict operation of electronic devices during restricted portions of flight such as landing and takeoff, and that does so without requiring passenger action.

Summary of the Invention

The present invention provides a method and apparatus that enables control via a wireless data connection of portable electronic devices while the devices are in an airplane. The wireless data connection of some embodiments is operable to control the power state of the portable electronic device via the wireless data connection. The invention provides in further embodiments the ability to communicate other data such as flight data to the portable electronic devices via the wireless data connection. In some embodiments, the wireless data connection and portable electronic device comprise a Bluetooth wireless data connection operatively coupled to a portable

BNSDOCID: <WO 0145064A1 >

computer.

Brief Description of the Figures

Figure 1 shows a block diagram of a general purpose computer as may be used to practice an embodiment of the present.

Figure 2 shows a block diagram of a system for controlling portable electronic devices on an airplane via a wireless connection, consistent with an embodiment of the present invention.

Detailed Description

In the following detailed description of sample embodiments of the invention, reference is made to the accompanying drawings which form a part hereof, and in which is shown by way of illustration specific sample embodiments in which the invention may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that other embodiments may be utilized and that logical, mechanical, electrical, and other changes may be made without departing from the spirit or scope of the present invention. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the invention is defined only by the appended claims.

The present invention provides a method and apparatus that enables control of portable electronic devices while in an airplane via a wireless data connection. The wireless data connection of some embodiments is operable to control the power state of the portable electronic device via the wireless data connection. In various

BNSDOCID: <WO_____0145064A1_I_>

embodiments, the portable electronic device is a portable computerized device such as a laptop. The invention provides in further embodiments the ability to communicate other data such as flight data to the portable electronic devices via the wireless data connection.

Figure 1 illustrates a general-purpose personal computer system 100, such as may be used as a portable electronic device consistent with the present invention. In this embodiment, processor 102, system controller 112, cache 114, and data-path chip 118 are each coupled to host bus 110. Processor 102 is a microprocessor such as a 486-type chip, a Pentium®, Pentium II® or other suitable microprocessor. Cache 114 provides high-speed local-memory data (in one embodiment, for example, 512 kB of cache memory) for processor 102, and is controlled by system controller 112, which loads cache 114 with data that is expected to be used soon after the data is placed in cache 112. Main memory 116 is coupled between system controller 114 and data-path chip 118, and in one embodiment, provides random-access memory of between 16 MB and 128 MB of data. In one embodiment, main memory 116 is provided on SIMMs (Single In-line Memory Modules), while in another embodiment, main memory 116 is provided on DIMMs (Dual In-line Memory Modules), each of which plugs into suitable sockets provided on a motherboard holding many of the other components shown in Figure 1. Main memory 116 includes standard DRAM (Dynamic Random-Access Memory), EDO (Extended Data Out) DRAM, SDRAM (Synchronous DRAM), RDRAM (Rambus DRAM), or other suitable memory technology. System controller 112 controls PCI (Peripheral Component Interconnect) bus 120, a local bus for system 100 that provides a high-speed data path between processor 102 and

BNSDOCID: <WO 0145064A1 I >

various peripheral devices, such as graphics devices, storage drives, network cabling, etc. Data-path chip 118 is also controlled by system controller 112 to assist in routing data between main memory 116, host bus 110, and PCI bus 120.

In one embodiment, PCI bus 120 provides a 32-bit-wide data path that runs at 33 MHz. In another embodiment, PCI bus 120 provides a 64-bit-wide data path that runs at 33 MHz. In yet other embodiments, PCI bus 120 provides 32-bit-wide or 64-bit-wide data paths that runs at higher speeds. In one embodiment, PCI bus 120 provides connectivity to I/O bridge 122, graphics controller 127, and one or more PCI connectors 121 (i.e., sockets into which a card edge may be inserted), each of which accepts a standard PCI card. In one embodiment, I/O bridge 122 and graphics controller 127 are each integrated on the motherboard along with system controller 112, in order to avoid a board-connector-board signal-crossing interface and thus provide better speed and reliability. In the embodiment shown, graphics controller 127 is coupled to a video memory 128 (that includes memory such as DRAM, EDO DRAM, SDRAM, SGRAM or VRAM (Video Random-Access Memory)), and drives VGA (Video Graphics Adaptor) port 129. VGA port 129 can connect to industry-standard monitors such as VGA-type, SVGA (Super VGA)-type, XGA-type (eXtended Graphics Adaptor) or SXGA-type (Super XGA) display devices. Other input/output (I/O) cards having a PCI interface can be plugged into PCI connectors 121.

In one embodiment, I/O bridge 122 is a chip that provides connection and control to one or more independent IDE connectors 124-125, to a USB (Universal Serial Bus) port 126, and to ISA (Industry Standard Architecture) bus 130. In this

BNSDOCID: <WO_____0145064A1_I_>

embodiment, IDE connector 124 provides connectivity for up to two standard IDE-type devices such as hard disk drives, CDROM (Compact Disk-Read-Only Memory) drives, DVD (Digital Video Disk) drives, or TBU (Tape-Backup Unit) devices. In one similar embodiment, two IDE connectors 124 are provided, and each provide the EIDE (Enhanced IDE) architecture. In the embodiment shown, SCSI (Small Computer System Interface) connector 125 provides connectivity for up to seven or fifteen SCSI-type devices (depending on the version of SCSI supported by the embodiment). In one embodiment, I/O bridge 122 provides ISA bus 130 having one or more ISA connectors 131 (in one embodiment, three connectors are provided). In one embodiment, ISA bus 130 is coupled to I/O controller 152, which in turn provides connections to two serial ports 154 and 155, parallel port 156, and FDD (Floppy-Disk Drive) connector 157. In one embodiment, ISA bus 130 is connected to buffer 132, which is connected to X bus 140, which provides connections to real-time clock 142, keyboard/mouse controller 144 and keyboard BIOS ROM (Basic Input/Output System Read-Only Memory) 145, and to system BIOS ROM 146.

A PCMCIA card controller (also known as a PC Card controller or CardBus controller) 160 is in one embodiment connected to the PCI bus 120, and is operable to interface the computer 100 to various PCMCIA hardware cads that may be inserted into PCMCIA slots of the computer system. The PCMCIA slots may receive, for example, a wireless data communication card such as a Bluetooth system complaint communication card.

Figure 1 shows one exemplary embodiment of a computer system that may be used with the present invention, however other configurations, such as varying bus

BNSDOCID: <WO 0145064A1 >

structures and memory arrangements are specifically contemplated and are within the scope of the invention. For example, the computer system of Figure 1 is in one embodiment of the invention implemented as a portable laptop computer system equipped with wireless data communication capability.

Figure 2 illustrates a system for controlling portable electronic devices on an airplane via a wireless connection, consistent with an embodiment of the present invention. Embodiments of both the apparatus and of methods of use of the apparatus consistent with the present invention are described herein, with reference to the elements of Figure 2.

An electronic device control apparatus 201 has operatively coupled to it a wireless communication device 202 operable to send a wireless signal. The electronic device control apparatus is in some embodiments a personal computer with software executing thereon that enables the computer to send various signals via the wireless communication device 202. The wireless communication device 202 is in various embodiments an infrared interface such as an IrDA (Infrared Data Association) interface, a radio-frequency interface such as a Bluetooth wireless interface, or any other suitable device. In various embodiments, the wireless communication device is operable only to broadcast or to send data, while in other embodiments the wireless communication device comprises a transceiver that supports 2-way communication.

The electronic device control apparatus 201 utilizes the wireless communication device 202 to communicate with at least one portable electronic device 203. The portable electronic device 203 may be any portable electronic device, including in various embodiments portable computers, cellular telephones, personal

BNSDOCID: <WO_____0145064A1_I_>

digital assistant (PDA) devices such as the PalmPilot PDA, or any other suitable device. The portable electronic device 203 comprises in part a wireless signal receiving device 204 operable to receive a wireless communication signal from the wireless communication device 202. The wireless signal receiving device 204 may be any type of device that is capable of receiving a wireless signal as is emitted by wireless communication device 202, and so varies with various embodiments of the wireless communication device. For example, the wireless signal receiving device 204 of one embodiment is a Bluetooth wireless data communication device implemented in a PC Card (also known as a PCMCIA card or CardBus card) which interfaces with a portable personal computer as is shown in Figure 2.

In various embodiments of the invention, any number of portable electronic devices 203, 205 and 206 may receive the signal emitted by the wireless communication device 202. These portable electronic devices may be of varying type, so long as each device in a single embodiment of the system is capable of receiving a signal emitted by the wireless communication device 202 of the same system.

In operation, the electronic device control apparatus sends data via wireless communication device 202 that indicates a desired operational or power state of the at least one portable electronic device 203, 205 and 206. For example, when an airplane is preparing to land, the electronic device control apparatus initiates sending of data via the wireless communication device 202, the data indicating that the portable electronic devices are to be brought to a reduced power or operational state that results in a reduction in potential for radiated radio frequency emissions that may interfere with electronic systems on the airplane.

BNSDOCID: <WO 0145064A1 >

The electronic device or devices are capable of receiving the transmitted data via the wireless signal receiving devices 204 associated with each electronic device, and are further capable of altering the electronic device power state in response to the transmitted signal. For example, where the signal indicates that the devices are to operate in reduced power state to reduce radio frequency emissions, each portable electronic device receives the signal and reduces its power state if necessary. In various embodiments, the portable electronic devices may in response to such a signal either power up or power down entirely, or may increase or reduce function such that the potential for radiated interference during decreased function is greatly reduced. For example, a device may reduce its clock speed in response to a signal indicating a reduced power state, where the reduction in clock speed results in a reduction in high-frequency radio frequency emissions.

In still further embodiments, the wireless data connection is further operable to transmit flight data information or other data, providing additional data to the portable electronic devices 203, 205, and 206. The flight data comprises data such as arrival and departure times, flight maps, food and beverage service information, in-flight entertainment information, or other similar information. In still other embodiments, the wireless data connection provides additional data, such as a connection to the Internet or e-mail capability. Such enhanced capability may be provided in various embodiments for a fee, or may be provided to passengers in certain classes of travel, or otherwise restricted in availability.

Communication between the electronic device control apparatus 201 and the at least one portable electronic device 203 is in some embodiments provided via a

BNSDOCID: <WO 0145064A1 I >

Bluetooth wireless communication device, which is a device supporting a wireless communication standard developed by the Bluetooth Special Interest Group, a consortioum of computer and wireless communication companies. The Bluetooth wireless communication standard is an example of a wireless communication system that is sometimes referred to as a PAN, or private area network system. Use of such systems is consistent with the present invention, which in different embodiments may also implement any other suitable wireless data communication methods.

The present invention provides in its various embodiments a method and apparatus that enable control via a wireless data connection of portable electronic devices while the devices are in an airplane. The wireless data connection of some embodiments is operable to control the power state of the portable electronic device via the wireless data connection. The invention provides in further embodiments the ability to communicate other data such as flight data to the portable electronic devices via the wireless data connection. In some embodiments, the wireless data connection and portable electronic device comprise a Bluetooth wireless data connection device or other personal area network connection device operatively coupled to a portable computer.

Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement which is calculated to achieve the same purpose may be substituted for the specific embodiments shown. This application is intended to cover any adaptations or variations of the invention. It is intended that this invention be limited only by the claims, and the full scope of equivalents thereof.

Claims

1. A method for remotely controlling the operation of at least one portable electronic device while the device is on an aircraft, comprising:

providing a data signal via a wireless data connection to the electronic device indicating a desired power state of the electronic device; and

changing the power state of the electronic device to the desired power state in response to the data signal if the current power state is not the desired power state.

2. The method of claim 1, wherein the wireless data connection comprises a Bluetooth wireless data connection.

3. The method of claim 1, further comprising transmitting flight-related data via the wireless data connection to the electronic device.

4. The method of claim 1, wherein the electronic device is a portable computer.

5. A method for remotely controlling the operation of at least one portable electronic device while the device is on an aircraft, comprising providing a data signal via a wireless data connection to the electronic device indicating a desired power state of the electronic device, wherein the electronic device is operable to change its power state to the desired power state in response to the data signal if the current power state is not the desired power state.

BNSDOCID: <WO_____0145064A1_I_>

6. The method of claim 5, wherein providing a data signal via a wireless data connection comprises providing a data signal via a Bluetooth wireless data connection.

7. The method of claim 5, further comprising transmitting flight-related data via the wireless data connection to the electronic device.

8. A method for remotely controlling the operation of at least one portable electronic device while the device is on an aircraft, comprising:

changing a power state of the electronic device to a desired power state indicated by a data signal provided via a wireless data connection if the current power state is not the desired power state.

9. The method of claim 8, wherein the wireless data connection is a Bluetooth wireless data connection.

10. The method of claim 8, further comprising transmitting flight-related data via the wireless data connection to the electronic device.

11. The method of claim 8, wherein the electronic device is a portable computer.

12. An electronic device control apparatus for use on an airplane, the device operable to send a wireless signal to at least one electronic device to control the power state of

the electronic device, the electronic device operable to change power state in response to the wireless signal.

13. The electronic device control apparatus of claim 12, wherein the electronic device comprises a portable computer.

14. The electronic device control apparatus of claim 12, further comprising a Bluetooth wireless data transmitter operable to send the wireless signal from the electronic device control apparatus to the at least one electronic device.

15. The electronic device control apparatus of claim 12, further operable to provide flight data to the at least one electronic device via the wireless signal.

16. An electronic device for use on an airplane, the electronic device operable to:

receive a wireless signal comprising desired power state data from an electronic device control apparatus; and

change a power state of the electronic control device in response to the signal.

17. The electronic device of claim 16, wherein the electronic device comprises a portable computer.

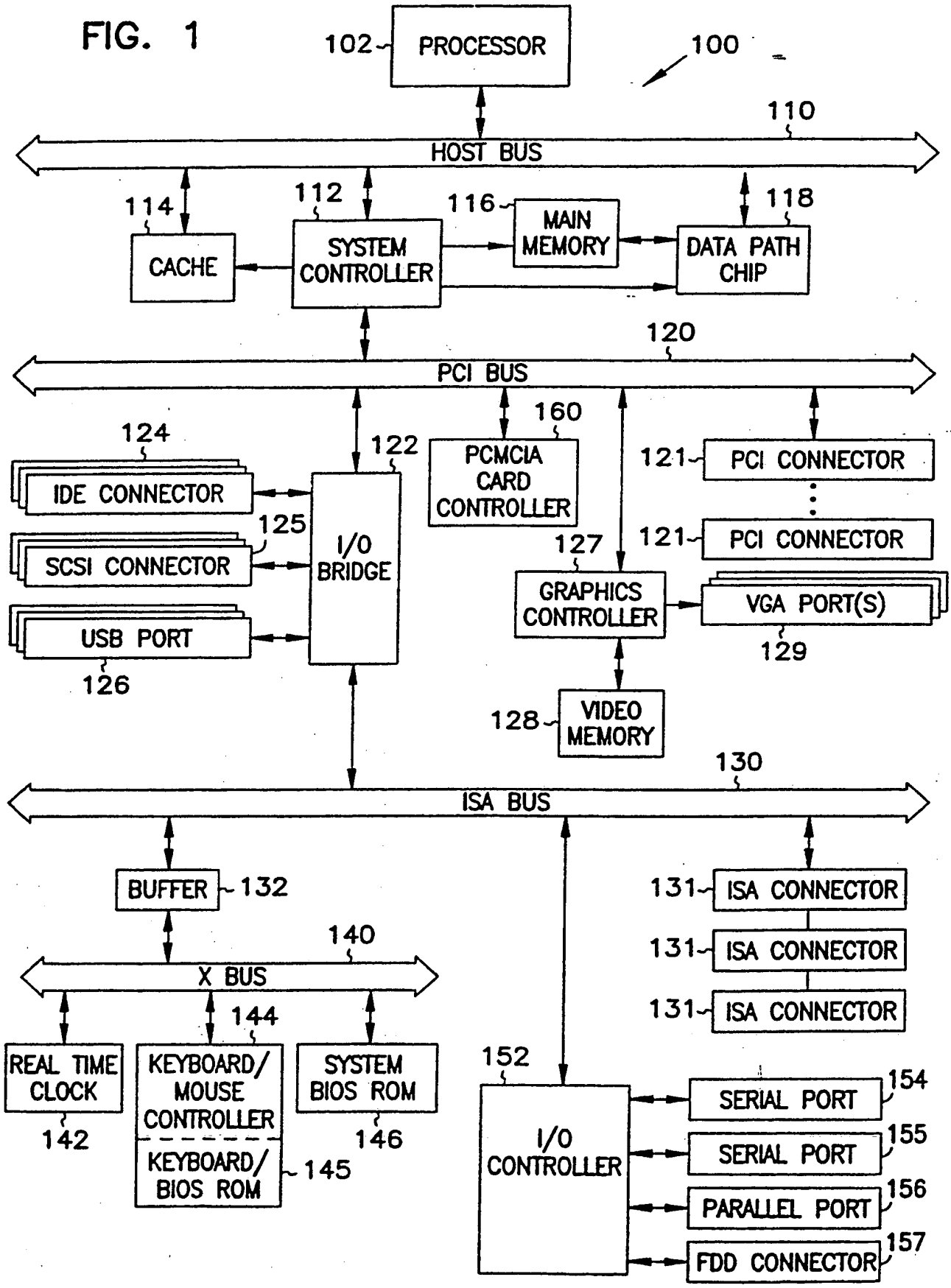
18. The electronic device of claim 16, further comprising a wireless data receiver operable to receive the wireless signal from the electronic device control apparatus.

BNSDOCID: <WO_____0145064A1_I_>

19. The electronic device of claim 18, wherein the wireless data receiver is a Bluetooth wireless data receiver.

20. The electronic device of claim 16, wherein the wireless signal from the electronic device control apparatus further comprises flight-related data.

FIG. 1


102
PROCESSOR
100
110
HOST BUS
114
CACHE
112
SYSTEM CONTROLLER
116
MAIN MEMORY
118
DATA PATH CHIP
120
PCI BUS
160
PCMCIA CARD CONTROLLER
124
IDE CONNECTOR
122
I/O BRIDGE
125
SCSI CONNECTOR
USB PORT
126
121
PCI CONNECTOR
121
PCI CONNECTOR
127
GRAPHICS CONTROLLER
VGA PORT(S)
129
128
VIDEO MEMORY
130
ISA BUS
BUFFER
132
131
ISA CONNECTOR
131
ISA CONNECTOR
131
ISA CONNECTOR
140
X BUS
144
REAL TIME CLOCK
142
KEYBOARD/ MOUSE CONTROLLER
KEYBOARD/ BIOS ROM
145
SYSTEM BIOS ROM
146
152
I/O CONTROLLER
154
SERIAL PORT
155
SERIAL PORT
156
PARALLEL PORT
157
FDD CONNECTOR

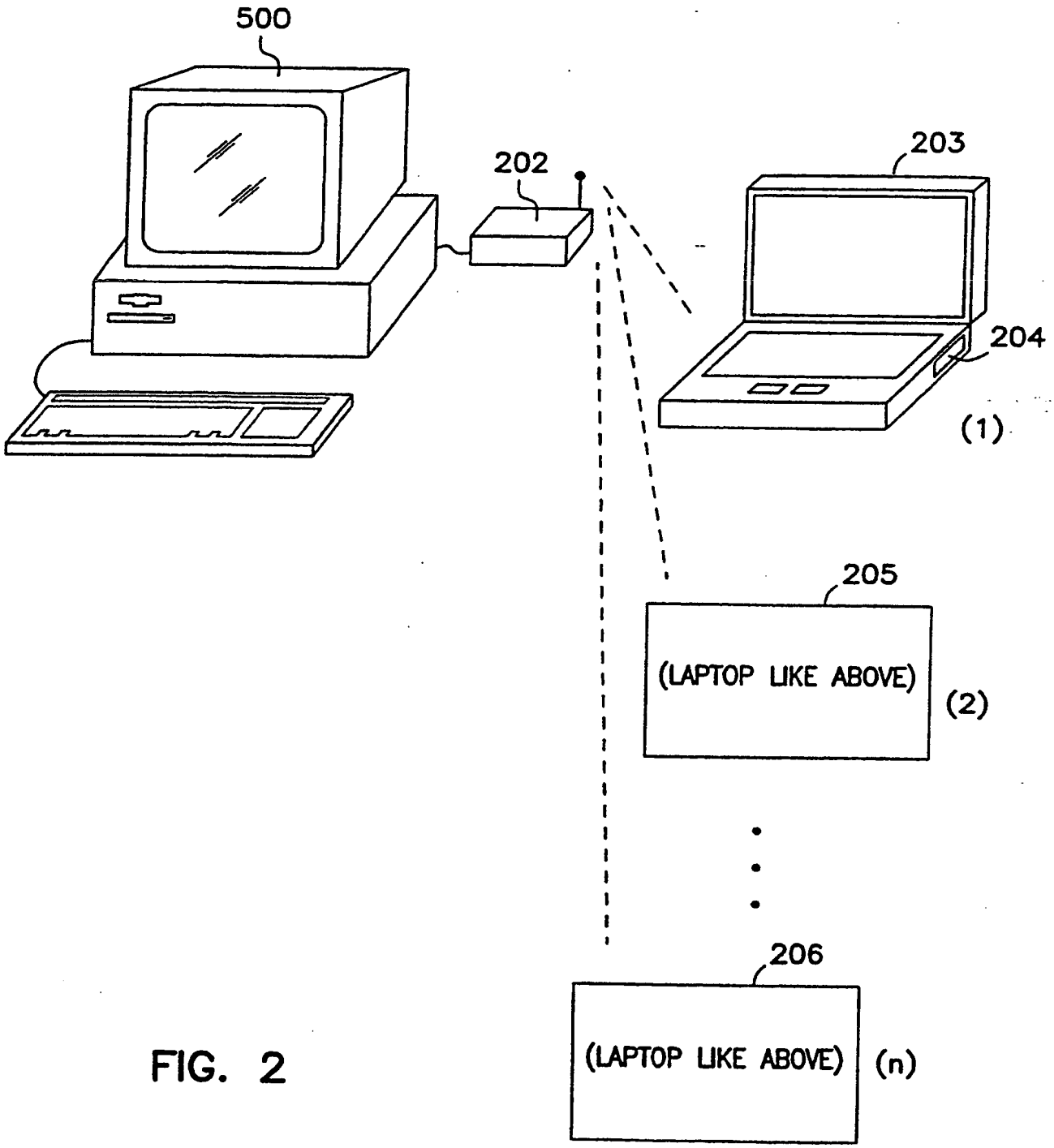

500
202
203
204
(1)
205
(LAPTOP LIKE ABOVE)
(2)
206
(LAPTOP LIKE ABOVE)
(n)

FIG. 2

INTERNATIONAL SEARCH REPORT

Internal . Application No
PCT/IB 00/01885

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G08C17/02 H04Q7/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 55102 A (ISRAELI GIL ;TE ENI BEN (IL); NETLINE COMMUNICATIONS TECHNOL (IL)) 28 October 1999 (1999-10-28) page 3, line 22 - line 28 page 9, line 10 -page 10, line 2 page 12, line 27 -page 13, line 20 page 20, line 22 -page 21, line 31 ---	1,2,5,6, 8,9,12, 14,16, 18,19
X	DE 197 30 595 C (HEYNEN KLAUS) 12 November 1998 (1998-11-12) column 1, line 3 - line 14 column 2, line 50 -column 3, line 13 column 4, line 27 - line 47 --- -/--	1,4,5,8, 11-13, 16-18

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 April 2001	17/04/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Pham, P

Form PCT/ISA/210 (second sheet) (July 1992)

BNSDOCID: <WO_____0145064A1_I_>

INTERNATIONAL SEARCH REPORT

Internat . Application No
PCT/IB 00/01885

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 49255 A (NOKIA MOBILE PHONES LTD ;IDMAN JOHAN (FI); KANGAS SAKARI (FI); KUR) 24 December 1997 (1997-12-24) page 5, line 21 -page 7, line 18 page 10, line 3 - line 23	1,5,8, 12,16,18
X	GB 2 329 794 A (MOTOROLA GMBH) 31 March 1999 (1999-03-31) page 3, line 1 -page 4, line 6	1,5,8, 12,16,18

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

BNSDOCID: <WO 01450A1 >

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat / Application No
PCT/IB 00/01885

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9955102 A	28-10-1999	AU 3343799 A	08-11-1999
		EP 1074156 A	07-02-2001
DE 19730595 C	12-11-1998	DE 29709099 U	28-08-1997
WO 9749255 A	24-12-1997	FI 962518 A	18-12-1997
		AU 2901397 A	07-01-1998
		EP 0976272 A	02-02-2000
GB 2329794 A	31-03-1999	NONE	

Form PCT/ISA/210 (patent family annex) (July 1992)

BNSDOCID: <WO 0145064A1 I >

THIS PAGE BLANK (USPTO)